

**WHAT IS CLAIMED IS:**

1. A method for classifying facial image data, the method comprising the steps of:

a) training a classifier device for recognizing facial images and obtaining learned models of the facial images used for training;

b) inputting a vector of a facial image to be recognized into said classifier, said vector comprising data content associated with one-half of a full facial image; and,

c) classifying said one-half face image according to a classification method.

2. The method of claim 1, wherein the classifier device is trained with data corresponding to full facial images, said classifying including matching said input vector of one-half image data against corresponding data associated with one-half of each resulting learned model.

3. The method of claim 1, wherein the classifier device is trained with data corresponding to one-half facial images, said classifying including matching said input vector of one-half image data against corresponding data associated with each resulting learned model.

4. The method of claim 1, wherein the classifying step comprises a Radial Basis Function Network trained for classifying inputs based on said facial image.

5. The method of claim 4, wherein the training step comprises:

(a) initializing the Radial Basis Function Network, the initializing step comprising the steps of:

fixing the network structure by selecting a number of basis functions  $F$ , where each basis function  $I$  has the output of a Gaussian non-linearity;

determining the basis function means  $\mu_I$ , where  $I = 1, \dots, F$ , using a K-means clustering algorithm;

determining the basis function variances  $\sigma_I^2$ ; and

determining a global proportionality factor  $H$ , for the basis function variances by empirical search;

(b) presenting the training, the presenting step comprising the steps of:

inputting training patterns  $X(p)$  and their class labels  $C(p)$  to the classification method, where the pattern index is  $p = 1, \dots, N$ ;

computing the output of the basis function nodes  $y_I(p)$ ,  $F$ , resulting from pattern  $X(p)$ ;

computing the  $F \times F$  correlation matrix  $\mathbf{R}$  of the basis function outputs; and

computing the  $F \times M$  output matrix  $\mathbf{B}$ , where  $d_j$  is the desired output and  $M$  is the number of output classes and  $j = 1, \dots, M$ ; and

(c) determining weights, the determining step comprising the steps of:

inverting the  $F \times F$  correlation matrix  $\mathbf{R}$  to get  $\mathbf{R}^{-1}$ ; and

solving for the weights in the network.

6. The method of claim 5, wherein the classifying step comprises:

presenting said half face input vector data to the classification method; and

classifying said half face image by:

computing the basis function outputs, for all  $F$  basis functions;

computing output node activations; and

selecting the output  $z_j$  with the largest value and classifying said half face as a class  $j$ .

7. An apparatus for classifying facial image data comprising:

mechanism for training a classifier device for recognizing facial images and obtaining learned models of the facial images used for training;

mechanism for inputting a data vector associated with a facial image to be recognized into said classifier device, said vector comprising data content associated with one-half of a full facial image, whereby said half face image is classified according to a classification method.

8. The apparatus of claim 7, wherein the classifier device is trained with data corresponding to full facial images, wherein said classifying including matching said input vector of one-half image data against corresponding data associated with one-half of each resulting learned model.

9. The apparatus of claim 7, wherein the classifier device is trained with data corresponding to one-half facial images, wherein said classifying including matching said input vector of one-half image data against corresponding data associated with each resulting learned model.

10. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for classifying facial image data, the method comprising the steps of:

a) training a classifier device for recognizing facial images and obtaining learned models of the facial images used for training;

b) inputting a vector of a facial image to be recognized into said classifier, said vector comprising data content associated with one-half of a full facial image; and,

c) classifying said one-half face image according to a classification method.

11. The program storage device readable by machine as claimed in claim 10, wherein the classifier device is trained with data corresponding to full facial images, said classifying including matching said input vector of one-half image data against corresponding data associated with one-half of each resulting learned model.

12. The program storage device readable by machine as claimed in claim 10, wherein the classifier device is trained with data corresponding to one-half facial images, said classifying including matching said input vector of one-half image data against corresponding data associated with each resulting learned model.

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